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THE VETERINARY JOURNAL

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JANUARY, 1945

EDITORIAL

POULTRY DISEASES

In this number of The Veterinary Journal we publish an important article describing a disease in poultry which has been the subject of investigation in this country. " Pullet Disease " has been described in America; its recognition in this country is now referred to in this article. It will be observed that its cause is not yet established, but the various features by which it can be recognised are given in detail.

During the present war the policy has been to reduce the numbers of poultry throughout the country to quite a low level; the numbers have been largely controlled by the amounts of available feeding-stuffs. When adequate supplies of animal feeding-stuffs again become available there is little doubt that an expansion of the poultry population will occur and there will arise a demand for more information on the keeping of healthy fowls by those who desire to make a living from them. It will be recalled that soon after the war of 1914-18 there occurred a very rapid expansion of the poultry industry and that, unhappily, due largely to inexperience and lack of sound knowledge, in some instances, disastrous results were experienced. It may almost be said that it was only within fairly recent times that the industry had recovered from the effects of the previous increase. The damage concerned poultry husbandry and disease control, and it was only as our knowledge increased that better methods of management and of disease control could be applied with beneficial results to the industry.

We are now in a much happier position in our ability to advise poultry

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keepers than was the case over twenty years ago. If the knowledge we possess can be applied on a wide scale the losses following any future expansion of the industry should be small compared with former times. It must be admitted that we have still much to learn on the causation of fowl mortality, but year by year, following research work in this and other countries, we gain important information and methods are devised for its practical application. We have to study apparently new diseases, "Pullet Disease" is an example, and means have to be found for their suppression. Our studies must embrace not only living agents, e.g., bacteria, viruses and other parasites, but nutrition, management, etc., come under our purview when we set out to determine the cause of losses from hitherto undetermined or undescribed conditions. The progress made within recent times has been great, and it is encouraging to know that more interest is being shown by all parties concerned in the raising and maintaining of healthy stocks.

It is disconcerting at times to observe that, in spite of existing knowledge on means of control, losses continue to occur, simply because the known measures are not being practised. Means will have to be found to disseminate all the information we possess on the methods of disease control that have been shown to be of value. Schemes are in operation now which ensure that some flocks, at least, receive all the necessary attention. Further schemes may be brought into operation which will assist still more; in addition, however, there is need for a general dissemination of present-day knowledge, and in this the veterinary profession has a big part to play.

General Articles

THE OCCURRENCE IN ENGLAND OF OUTBREAKS OF DISEASE IN POULTRY RESEMBLING THE "SO-CALLED PULLET DISEASE" OF AMERICA

By R. F. GORDON, B.Sc., M.R.C.V.S., and J. D. BLAXLAND, M.R.C.V.S.,
Weybridge

DURING the past year, and particularly in the last four months, we have encountered in the course of our routine post-mortem examinations of poultry a condition not previously observed by us, which appears to be fairly widespread and of considerable economic importance. Although the etiology of the condition is obscure, the histories of the outbreaks, the symptoms and the autopsy findings have been sufficiently constant to lead us to consider that the syndrome resembles the "so-called Pullet Disease" or "Blue Comb" recognised in America.

In all, twenty outbreaks have been encountered. The first case was observed during November, 1943, and a further outbreak was seen in December of the same year. No further cases were encountered until July, 1944, since when seventeen outbreaks have occurred on farms in Hampshire, Hertford, Dorset, Essex, Oxford, Berks, Gloucester, Worcester and South Wales.

In all cases the mortality rate has been low, varying from 2 to 25 per cent. of the flock, although in most outbreaks 50 to 90 per cent. of the flock have been affected. Usually the majority of affected fowls have recovered, but the loss in condition and in egg production was generally severe, and recovered fowls appeared to suffer a considerable set-back. The fowls primarily affected were pullets, of 6-8 months old, and usually those in early or commencing production. Older fowls and cockerels were affected only in a few cases, and then usually towards the end of the outbreak.

Probably a clearer picture can be obtained if a few typical cases are described in detail.

(1) The first outbreak observed occurred during November, 1943, on a farm in Hampshire carrying a total stock of 1,000 birds. The condition was almost entirely confined to pullets, about 500 of which were seen to be affected, and these varied from fowls well in lay to those just commencing production. All the pullets and hens had been mated up, but only in one of the mated pens were cockerels affected, and the only other fowls affected on the farm were one or two cocks in two pens of 25 cocks each. Not more than 10 fowls died, but the egg yield stopped completely.

(2) This outbreak occurred during the first week of November, 1944, on a farm in Worcester with a total stock of 650 birds. The mortality was low, only eight fowls died, but during the course of three weeks practically all fowls were affected and the egg yield dropped from 50 per cent. to nil. After the fourth week 25 per cent. were again in lay, but the fowls appeared to have suffered a severe set-back. Ducks and geese on the farm were not affected. The losses or drop in egg production occurred within one week of the introduction of a fresh consignment of mash.

(3) During September, 1944, an outbreak occurred on a farm in Glamorgan. The total birds in the flock were 400, and 24 hours after feeding a new supply of mash there was complete cessation of laying in 200-300 fowls. Sixteen deaths occurred within four to seven days of the commencement of symptoms. The condition ran a course of three weeks and the majority of the fowls recovered. Cockerels did not show symptoms until one week after the appearance of the disease in the pullets.

(4) A further outbreak was seen on a farm in Carmarthen during the first week of November, 1944. The total stock was 195 fowls. Within 24 hours of feeding a new sack of mash approximately 90 per cent. of the flock was seen to be affected, and ten fowls died. Twenty-four hours previous to feeding the new mash this flock had been inspected by the Country Poultry Instructor, who had commented on the excellent condition of the flock.

(5) At about the same time an outbreak occurred in Berkshire, and in view of its proximity to the laboratory the farm was visited and a more detailed history obtained. The total fowls on the premises was 220, of which 175 were pullets of 8-9 months old. The first indication of disease was a pronounced drop in the egg yield of the pullets, up to 50 per cent. of which had been in full production. At the time of the visit nine pullets had died; but with the exception of one pen of fifteen fowls practically all the pullets had been affected, and symptoms were becoming apparent in a few of the older hens.

The disease appeared to run a progressive course, and fowls in the first pens affected appeared to recover within 14 days, while fresh cases were still occurring in pens previously unaffected. The first cases appeared to run an acute course, and were picked up dead without having shown premonitory symptoms. Later in the outbreak, affected fowls showed symptoms for 4-7 days before death and exhibited marked loss of condition. The egg production figures for the two first pens to be affected are illustrated in Table I and graph, and are typical of a number of outbreaks observed. Prior to the first death on October 31 the average daily production from the 100 pullets in these two pens was 50 to 60 eggs.

TABLE I

Date	*Pen I (50 fowls) No. of eggs per day*	*Pen II (50 fowls) No. of eggs per day*	*Total eggs per day*
Oct. 31	28 (2 deaths)	28	56
Nov. 1	18	27	45
„ 2	18	19	37
„ 3	14 (1 death)	23	37
„ 4	14 (1 death)	15	29
„ 5	8	8	16
„ 6	8	12	20
„ 7	4	6 (1 death)	10
„ 8	4	2 (1 death)	6
„ 9	3	5	8
„ 10	2	1	3
„ 11	2	2	4
„ 12	3	2	5
„ 13	5	1	6
„ 14	4 (all fowls appeared to have recovered)	0 (a few fowls still showing symptoms)	4

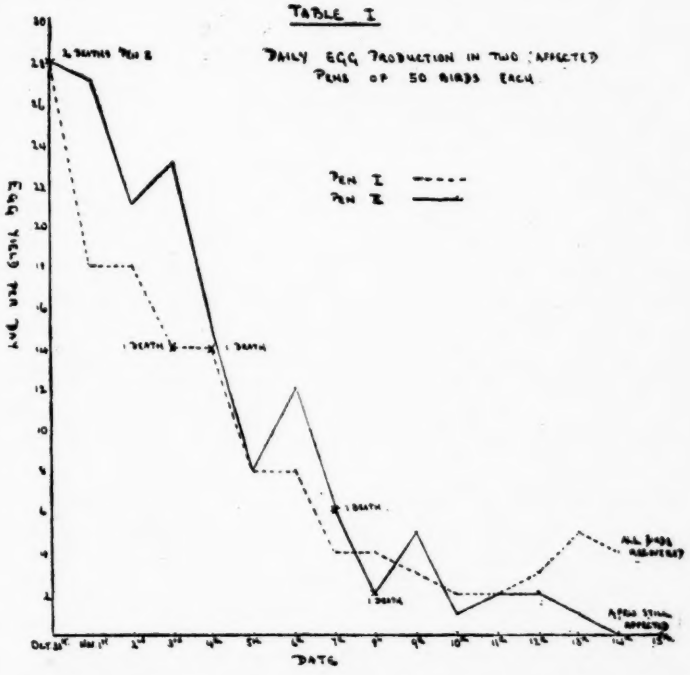
The first death on this farm occurred ten days after an equal part of a new mash had been added to the ration. A week later these proportions were altered

to two parts of the new mash to one part of the old. On November 11 the new mash was discontinued.

In all the twenty outbreaks encountered, the symptoms and post-mortem findings were fairly constant and characteristic, with some variation only in the degree of acuteness. In the five outbreaks described in detail the typical symptoms and post-mortem lesions were particularly well marked.

Symptoms

In most cases the first noticeable symptom was the marked drop in egg production; followed by inappetance and inconstant diarrhœa varying in colour from green to white, and accompanied by the usual dullness and ruffled plumage. The most characteristic symptoms in individual fowls were marked cyanosis of the comb, head and wattles (blue comb), and apparent paralysis of the crop.



As a rule the crop was markedly distended, the distension being visible from some distance. It was also noted that the crop was full of sour smelling, doughy foodstuff, even twelve hours after a meal. Fowls which showed "blue comb" or distension of the crop generally succumbed. The course of the disease varied, from a few peracute cases in which death occurred without obvious symptoms having been seen, to a chronic form in which illness lasted over a period of 7-10 days with general loss of condition followed by apparent recovery. In the majority of fatal cases death occurred 4-7 days after the onset of symptoms.

Post-mortem Findings

The most constant and characteristic lesion was an acute urate nephritis, accompanied in a number of cases by the familiar picture of visceral gout. Generally the kidneys were markedly enlarged, pale and showing petechiation. The surface of the kidney was covered to a varying degree with a chalky white crystalline deposit of urates. The kidneys, tubules and the ureters were usually impacted with similar material. Frequently the serous surface of the visceral organs, particularly the liver and pericardium, showed the same condition.

In all cases where the ovary was functioning there was acute degeneration of that organ, the egg folicules being soft, misshapen or broken. Frequently the contents of the ova were a dirty greenish colour, as distinct from the normal rich orange.

Usually the crop and gizzard were distended or even semi-impacted with a sour mass of food and coarse grass. The carcase generally had a congested appearance and the skeletal muscles, particularly the pectorals, showed extensive patchy congestion resembling "fish-flesh." In Table II an attempt has been made to illustrate the percentage occurrence of the post-mortem lesions, and of the outstanding symptoms observed in the outbreaks encountered. In discussing this table it must be pointed out that, whereas the post-mortem findings are complete and give an accurate picture of the relative constancy of the lesions described, the percentage occurrence of the symptoms is only an approximate minimum, since in many cases it was not possible to obtain full histories.

It will be seen that nephritis occurred in over 70 per cent. of the 58 fowls examined from the 20 outbreaks, and was actually seen in at least one fowl in every outbreak. It was accompanied by visceral gout in 41 per cent. of the birds examined, or in 70 per cent. of the outbreaks. The next commonest lesion was distension of the crop, which was observed in 62 per cent. of the fowls examined and in 80 per cent. of outbreaks. It is not possible to give the accurate percentage occurrence of degeneration of the ovary, since in many cases that organ was non-functioning, but nevertheless it occurred in 25 per cent. of the fowls examined and in nearly 50 per cent. of the outbreaks. The congestion of the carcase described occurred in the same proportion of cases.

The histories received were not always complete, but "blue comb" was the commonest symptom observed, being reported in 12, or 60 per cent., of the outbreaks. A drop in egg yield or even complete cessation of production was reported in 55 per cent. of the outbreaks, and distended crops were noted in 40 per cent. Where the details were available the average mortality was in the region of 5.8 per cent., and morbidity approximately 84 per cent.

It is of significance to note that in 40 per cent. of the outbreaks there was a history that the condition appeared within a few days of the introduction of a new consignment of food. In the other outbreaks no definite history was obtained on this point.

Discussion

The histories, symptoms and post-mortem lesions in these outbreaks bear a striking resemblance to the condition first described in America by Beaudette (1929) and termed by him "X disease." During the past decade a similar condition has been reported throughout most of the North-eastern States of

America. Jungherr and Levine (1940 and 1941) carried out a systematic study of the disease, and Jungherr (1944) gives a comprehensive account of the condition under the title of "So-called Pullet Disease." Other synonyms used to describe the disease in America are: Blue comb, summer disease, unknown disease, X disease, contagious indigestion, hepato-nephritis.

In America the disease usually affects adult fowls between the ages of 5-7 months, and particularly those in heavy production. It has also been seen in four-week-old chicks and in two-year-old layers. The condition is characterised by cyanosis of the comb and wattles, depression, inappetance and sudden death, but flock mortality is low. Individual fowls show a distension of the crop, sunken eyes, and a high fever in the terminal stages. Laying flocks suffer a severe drop in egg production. The course of the disease in most cases extends over a period of from one to two weeks and terminates in a high percentage of apparent recoveries. Acute and subacute forms of the disease occur.

In this country, the symptoms and course of the disease are very similar. In most outbreaks the first indication of disease in a flock has been the sudden decrease or even cessation of egg production. Prior to the first appearance of the condition, egg production usually had been in the region of 50 to 75 per cent., and after a period of 10-14 days the egg yield again gradually increased. The outbreaks in many instances appeared to resemble a slow infection, and quite frequently the fowls in the first pen to be affected would have recovered while production was still decreasing in neighbouring pens. The symptoms in individual birds were similar to those described by Jungherr (1944).

In the acute form described in America, liver and muscle lesions with hæmorrhage on the serous membranes appear to predominate, while in subacute form the renal changes are most marked. Findings common to both types are: degeneration of the skeletal muscles (fish-flesh appearance), necrosis of the liver and pancreas (chalkiness), and acute degeneration of the ovary with soft and broken egg follicules. The gross lesions in the kidneys varied from insignificant changes to marked enlargement, and finally the typical picture of uric nephritis and visceral gout.

Most of the outbreaks so far encountered in this country resemble the subacute rather than the acute form. Only in two cases have hæmorrhages been seen on the serous surfaces, or on the abdominal and gizzard fat. The necrotic lesions of the liver have been observed only once, whilst the chalky pancreas has also been uncommon. The various kidney changes, visceral gout, degeneration of the ovary, and patchy congestion of the pectoral muscles have all been fairly constant findings. The presence of coarse rank grass in the distended crop occurred more frequently than it appeared to do in the cases reported in America.

The exact course of the pullet disease syndrome is unknown. Most of the American workers have carried out etiological studies, but without obtaining any definite results. Weisner (1941) claimed that the condition is caused by certain strains of *Escherichia coli*, but his evidence is inconclusive. Waller (1942) reported the isolation of a filterable virus, but was unable to state whether the virus represented the sole etiological agent.

In the outbreaks so far studied in this country no infective agent could be

TABLE II

OCCURRENCE OF POST-MORTEM LESIONS AND OUTSTANDING SYMPTOMS

	POST-MORTEM FINDINGS						SYMPTOMS AND HISTORIES					
Outbreaks No.	*No. of birds examined*	*Nephritis*	*Visceral gout*	*Carcase congested*	*Ovary de-generated*	*Crop and gizzard distended*	*Blue Comb*	*Drop in egg yield*	*Distended crops*	*Mortality*	*Morbidity*	*Food suspected*
1	4	4	2	0	0	4	Yes	Yes	Yes	2%	100%	—
2	2	2	0	1	0	1	—	—	—	4%	80%	—
3	13	6	5	0	0	8	—	Yes	Yes	2.5%	—	—
4	7	4	2	0	0	4	Yes	—	Yes	25%	50%	—
5	2	3	0	0	1	2	Yes	Yes	—	3%	12%	—
6	2	2	1	2	1	0	Yes	Yes	—	4%	—	—
7	3	1	0	0	1	3	Yes	—	Yes	8%	—	—
8	2	2	1	2	0	2	Yes	Yes	—	4%	75%	Yes
9	5	3	0	0	5	0	—	Yes	—	—	—	—
10	2	2	0	2	1	1	—	—	—	—	—	—
11	2	2	0	0	0	1	Yes	—	—	—	—	—
12	1	1	1	1	1	1	Yes	Yes	—	—	—	Yes
13	1	1	1	0	0	1	—	Yes	—	6%	100%	Yes
14	2	2	2	1	1	2	Yes	Yes	Yes	2%	100%	Yes
15	1	1	1	0	0	1	Yes	—	Yes	—	—	Yes
16	1	1	1	0	0	0	Yes	—	Yes	—	90%	Yes
17	5	4	4	4	3	3	Yes	Yes	Yes	4%	100%	Yes
18	1	1	1	1	0	1	—	Yes	—	—	100%	Yes
19	1	1	1	1	1	1	—	—	—	—	100%	—
20	1	1	1	1	0	0	—	—	—	—	100%	—
Total	58	43	24	16	15	36	12	11	8	5.8%	84%	8
Percentage of birds examined		72.4	41.3	27.5	25.9	62.0	60	55	40	Average Percentage of outbreaks		40

Key: — = no history on this point.

incriminated. In all cases routine cultural examinations were made from the liver, spleen, kidneys, ovary and bone-marrow, but with entirely negative results. Transmission experiments have also been conducted with material from nine of the outbreaks, liver, spleen, kidney and ovarian emulsions, being injected intravenously and intramuscularly into healthy fowls. In no case have any symptoms been observed in the inoculated fowls.

In this country the frequent history that the onset of the disease coincided with the use of a fresh supply of food suggests a nutritional factor, and supports Jungherr's opinion that the condition is a nephro-toxicosis, probably of metabolic origin. A small number of feeding experiments have been carried out with some of the suspected foodstuffs, but so far we have been unable to reproduce the disease. This aspect of the problem is being pursued further.

Nephritis and visceral gout are a familiar picture to those engaged in routine poultry post-mortem examinations. In the many thousands of carcases examined in this laboratory during the past ten years the condition, although relatively common, has invariably occurred in individual fowls, and has been seldom, if ever, associated with a history of disease in the flock. It is this latter feature, of a widespread illness in the flock with characteristic symptoms, and constant post-mortem findings, which has led us to consider that the condition is a distinct entity, of which the primary lesion appears to be a uric nephritis.

Summary

Twenty outbreaks of disease in poultry in England and Wales resembling the "so-called pullet disease" of America are described. Although the mortality rate is low, it is accompanied by a serious drop in egg yield in the flock, and the condition is of considerable economic importance.

The outstanding symptoms are "blue comb," distended crop and decreased egg production, while the characteristic post-mortem findings are nephritis, visceral gout and ovarian degeneration. So far the etiology is obscure.

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THE STUDY OF ANIMAL BEHAVIOUR FROM THE VETERINARY ASPECT: OR, THE IMPORTANCE OF PROSECUTING THE STUDY OF ANIMAL BEHAVIOUR, AND SUGGESTIONS FOR ITS DEVELOPMENT AS A FIELD OF VETERINARY ENDEAVOUR*—I

By J. T. EDWARDS, D.Sc., M.R.C.V.S.,

(1) ". . . The superficial or the selfish observer, the ignoramus or the human brute, may regard the domesticated animals merely as machines created to administer to his pleasure, and which he may torture or destroy as caprice may suggest; but he who has looked around him with an observant eye—the veterinarian, whose duty as well as whose delight it has been to study the conformation and the character of inferior animals, both physical and moral, has seen enough to admire and to love, in those whose medical guardian and friend he has undertaken to be, and to make him regard with sovereign contempt the sneer of the bystander, whether he be a learned man or a fool."—W. YOUATT (1832) in *The Veterinarian, 5,* 275.

(2) ". . . He (Bracy Clark) tells us in 1830, that as a relief to severe studies, in 1810, he took up the subject of breaking horses in order to study psychology. . . . He was a very humane man, and shows that harsh treatment readily converts nervousness into vice."—" The Early History of Veterinary Literature," by SIR F. SMITH, vol. 3, pp. 44 and 57.

(3) "I now take my leave with this simple remark. 'I wish,' said a celebrated sportsman to me, knowing that I occasionally contribute to your pages, 'you would induce the veterinary profession to turn their attention as much as possible to the living *as they do to the* dead *horse. The latter,' added he, 'they have pulled to pieces so effectually as to know every bone, muscle, joint, nerve, sinew, and fibre in his carcass, and great is the value of their research; but they might tell us a little more of the living one.'"* —NIMROD (1841) in *The Veterinarian, 14,* 35.

(1) Introduction

FIRSTLY, may I be forgiven for introducing my theme on a personal note? I chose well over thirty years ago a veterinary career at the close of the somewhat intensive secondary school education imparted locally at that time so as to combine, as I thought, what advantages that were to be derived therefrom with the rather special interests and natural inclinations accruing from an early childhood spent for a large part in contact with animals. Subsequent experiences, as a veterinary student, a veterinary teacher and investigator of problems concerning animal health and disease, both at home and abroad, have brought home to me forcefully that a career, chosen for those twofold reasons, was not, in

* A summary of this paper was read at the joint meeting of the British Society for Animal Production and the Institute for the Study of Animal Behaviour held at the London School of Hygiene and Tropical Medicine on Wednesday, October 25, 1944. The summary will be duly published in the journal of the former society.

the event, destined to pursue an entirely smooth course. Indeed, so difficult at times has it been to bring into mental harmony the conflicts arising from long-continued attempt at adaptation, on the one hand, to school-engendered disciplines and, on the other hand, early natural inclination, to observe closely and learn direct from the animal that the lament, many years ago, of a Red Indian chieftain comes to mind. He was asked by the civil administrator why no more young men of his tribe were being sent to be educated at the new American universities. He replied: "No, no, you spoil our young men. They come back to us unable any more to make a living and be happy leading our way of life, for they cannot outwit an enemy and know nothing about the behaviour of animals and so cannot even track a deer for their food."

It is not that many opportunities have not arisen—and these particularly valuable ones—for perceiving the importance and significance of studies upon animal behaviour and comparative psychology in the course of a life devoted to research upon animal disease problems in the enclosed surroundings of a modern establishment devised specially for investigation of those problems. For example, using for purposes of experiment an animal which so far has not been induced successfully to reproduce in captivity, namely, the hedgehog, which undergoes striking seasonal changes in the activity of its reproductive system, with, as we now know, corresponding changes in the endocrine glands, one cannot but be led to note the seasonal changes in behaviour, especially of the male, of the species which are correlated with these endocrinal fluctuations. The variations in intensity of the "male" characteristics, that is, of "aggressive-possessiveness," "voice" and "manner," of the human personnel locally employed, bodily exposed as they are daily in performing their duties, become similarly illuminatingly displayed as functions of their hyper- or hypogonadism. Furthermore, in all species, and particularly in the more sensitive individuals of sensitive species, such as rabbits and goats, results that are dependable in the course of many pathological and other investigations can only be obtained when these animals are selected, for critical experiment and control, so as to be uniform, in the matter of age, breed and bodily condition, and are well cared for and, above all, are kept in conditions in which they are entirely *happy*.

Interesting therefore as the theme now selected for presentation is to a modern research worker upon problems affecting the animal economy, it need hardly be said that to the veterinarian who decides upon a career in private practice the theme becomes one of abiding and transcending importance. During discussions recently within the veterinary profession upon the remodelling of a system of education best fitted to turn out good recruits for all modern requirements, including practice, which still demands the largest number of graduates, expressions have been heard from men who are well-established and successful, such as "a good veterinary surgeon is born, and not made"; "the spirit of a veterinary teaching institution which is traditional"; "the advantages of getting together young people imbued with a similar spirit"; "the art of the veterinary surgeon which has been handed down through countless centuries," etc.

At times there may be in the content of such statements much that can be shortly dismissed by an intellectual as savouring of flagrant conceit and mere imposture. However, it is incumbent upon an educationist to inquire what is

in them of real meaning in perhaps inherited aptitude of an individual for the particular vocation he has chosen, or has been chosen for him, and to what extent that inherited aptitude, if a way can be determined to recognise it and if it be found to exist, can be further conditioned by placing within reach of the specially apt pupil the means and circumstances for acquiring the highest proficiency. Again, it is incumbent upon the educationist to prosecute inquiry further to ascertain what are those particular means and circumstances if such there be. It has not been made abundantly clear that hitherto proper inquiry has been made, partly from defects in the systems as yet devised for conducting such inquiries, and, it is to be regretted, largely because full recourse has not been made invariably to the vast amount of historic and other material available, on careful search, for pursuing sound inquiry. More and more, and particularly from the acceleration in devising measures during the emergencies of the present war to economise and make the best possible use of manpower, standardisation of tests for vocational aptitude may be expected. Here the experience of the great defence services may be drawn upon, for it may be taken for certain that the stresses of war will have caused them, at any rate, to throw overboard all that was decrepit and ineffectual in their traditions.

Failing vocational selection on such lines it is to be feared that a phenomenon which has made itself manifest only during the past three decades or so will become increasingly evident, namely, that after the term of their schooling recruits to whom qualification to practise the veterinary art is legally attributed will seek at once and almost gravitate, as it were, into the shelter of secure State employment, wherein those faculties in dealing with living animals with which the public has associated its veterinary members since time immemorial need not always be given full exercise, and wherein those faculties will become, in consequence, benumbed and atrophied.

Shortly before this war my interest was directed to the activities of the Institute for the Study of Animal Behaviour, which then had not long been formed, and I endeavoured (through the official journal of the National Veterinary Medical Association, *The Veterinary Record*) to attract the notice of my profession to the prospects of allying itself with those activities. Recently I have been honoured by nomination to the Council of the Institute, and the theme I am developing here is presented in part-fulfilment of an obligation I have undertaken towards that Council.

During the past year I was also honoured with the Presidency of the Comparative Section of the Royal Society of Medicine. Advantage was taken of that opportunity to bring systematically to notice the outlet which was already conceived as now most urgently demanding exploitation. It was hoped to bring that outlet to the notice not only of the veterinary profession, but also of those engaged in fields of work in large degree overlapping the activities of members of the profession and in very large degree contributory towards the useful expansion of veterinary knowledge.

Hence a continuous theme was selected which after preliminary display in a presidential address led up through a series of subjects to the culminating one of comparative psychology and animal behaviour. The series of subjects selected as forming a rational approach to this culminating subject were: (1)

animal ecology; (2) animal genetics; (3) animal nutrition; (4) endocrinology; (5) neurology; and (6) psychiatry and psychopathology. The relevance of the various subjects was expounded by specially competent workers (see *Proceedings of the Royal Society of Medicine*).

Did space permit, it would be a fascinating exercise to summarise the aspects in which each of these rapidly expanding sciences furnish fundamental contributions to a rational perception of the subject of comparative psychology and animal behaviour. How, for example, studies in animal ecology show that in a feral condition a species survives in a state of more or less stable "balance" with a limited number, not exceeding two hundred, other species, in any given environment; how the upsetting of this balance by interference with the life-habits of any one species may affect profoundly the habits and chances of survival of the rest; how recent studies in animal genetics are throwing a flood of light upon the processes which often, with conspicuous success, were exploited by Robert Bakewell and the other old-time animal breeders during the 18th century endowed, as they seemed to be, with uncanny powers of animal observation; how the advances in animal nutrition during the last few decades have provided illumination on the needs of the animal for successful reproduction and a well-co-ordinated nervous system besides ordinary bodily growth and maintenance; how variations in endocrine function can profoundly affect behaviour; and how the researches of modern psychopathologists, especially of the psychoanalytical school, have caused them to expand their interests and delve deeply into the comparative field for an explanation of the phenomena that come to their notice.

Each of these subjects was treated by the selected speakers to illustrate also the limitations as well as the uses of the comparative method of study. Anyone who has had long experience of the use of this method—in comparative pathology, for example—has within his recollection memories of the grave pitfalls that are encountered when the information gained from study of one species is applied too readily to another. Soon the need is impressed upon one's mind that to a certain degree each species, and indeed every condition arising in a given species, needs to be studied separately to prevent dangerous generalisation. This need is already made very evident from the reports of workers studying in the field of animal behaviour.

The dropping of the study of animal genetics within the University of London soon after the last war has since, it is understood, been the cause of much regret. It would be most unfortunate if from similar cause the study of animal behaviour were allowed to lapse. So far the work done upon it in this country is scanty, though it holds out much promise. Our American colleagues, however, have not been slow to appreciate its importance, and comparative psychology now forms an important branch of psychological study, with a voluminous literature and a special journal devoted to it.

(2) History of the development of the Veterinary Art in Relation to the Origins of the Study of Animal Behaviour

In one way, animal behaviour has been one of the oldest of all studies. In another way, it is one of the most recent of all. I need hardly dwell on its antiquity, because primitive man, who was a hunter, like some primitive peoples

surviving to-day, had perforce to study closely the behaviour and habits of the animals which he hunted for food and of those he feared, to an extent which can scarcely be imagined by civilised peoples.

It was Aristotle, however, who, in the fourth century before the Christian era and in the great age of Greek culture, first brought to bear upon the subject a highly trained biological mind. Unfortunately for the comparative biological method, and fatally, as we can now well perceive, especially from Leclainche's historical studies, for the healthy development of the veterinary art for about two thousand years in the West, the contemporary Hippocratic doctrine, of untold benefit as it was long assumed to be to human medicine, by yielding to the philosophic doctrines of Socrates and Plato which, in their efforts to dignify the human personality, ascribed to the human being a "soul" that was denied to other animals, rejected the comparative method for the pursuit of knowledge in medicine. Veterinary medicine, which for long was locally not much suppressed by these doctrines and might have outlived them, did indeed develop to a high pitch in the Eastern Roman, Greco-Roman or Byzantine Empire, attaining its zenith about the 4th century A.D. in the hands of the *Hippiatrists*. With the decay of the Western Roman Empire about that time, and the subsequent spread of a theocracy through its remaining fabric, which, it has been said, was compounded by the early Church fathers (St. Augustine and others), mainly from Alexandrian neo-Platonism and Galilean masicho-sadism, human medicine became entwined or re-entwined with theology, the Dark Ages coinciding with the relegation of the animal world to a position that denied to it pity or succour. The cult of the Byzantine *hippiatrists*, however, survived, gloriously, within the Arab Empire, though nothing much that was new or original was added to it. Indeed, even after the expulsion of the Moors from Spain the Catholic monarchs saw advantage in fostering the utility through promoting the dignity of practioners in the animal healing art—the *Albeiteras*—and it was not until 1813, when the Cortes by dissolving state corporations destroyed the governing and examining body of their members formed for centuries under Royal patronage —the *Proto-albeiteriat*—that the profession became disintegrated and shattered.

The founding of the veterinary schools in Europe, as independent foundations, mainly under State patronage and subsidy (though this was not so in England), beginning with the Lyons school in 1762, has been ascribed to various causes, though their founding at the time seems to have been inevitable. One cause was the concern of monarchs and States about the alarming losses caused by animal plagues, principally glanders in army horses and the outbreaks of cattle plague which usually followed in the wake of armies. Another cause was the rapidly growing interest in what was called natural history, or natural philosophy, especially in France. This study attracted the interest of many surgeons, who, descended from far humbler status than the physicians who were still allied in their training and practice to the Church, did not disdain to extend their concern towards animals. Many of the earliest practitioners of the veterinary art about the time of the opening of the schools were therefore also surgeons, and many were eminently successful. The great surgeon-naturalist, John Hunter, for example, was "the life and soul" of the movement which brought about the opening of the first veterinary school in London in 1791. But

for the mishap of an appointment to that school, in 1793, of a head who was averse to the admission of surgeons for veterinary training, the veterinary and surgical professions in this country might have remained in close fraternity. It has always to be remembered that by the time the Medical Act of 1858 was passed, which created the General Medical Council, three corporations, comprising the physicians, the surgeons and the apothecaries, respectively, whose origins went back to considerable antiquity and whose members were of very different training and outlook, and held vastly different grades of social standing, granted diplomas to practise medicine. When, previously, by the grant of the Royal Charter of 1844, the veterinary profession was legally recognised, the promoters of the movement to obtain this instrument were not confronted with a similar impediment against the submission of entrants to a common test of competence.

The failure to develop veterinary education along the broad, comparative, lines contemplated by John Hunter at the London School has been ascribed to the incompetence and avarice of the man (Coleman) who remained for nearly half a century head of the School, but somewhat similar phenomena are now seen to have operated to some degree at most of the continental schools.

It has to be recalled that from about the time of the Reformation in the early 16th century to the time of the Industrial Revolution in the late 18th century, the sheep was the dominant animal in the British agricultural economy, the export of wool being a chief source of wealth.

After the Industrial Revolution, and indeed extending down to well within living memory, to the beginning of the 20th century, the horse was supreme.

Indeed, the period between the opening of the veterinary schools and the grant of the Charter of Incorporation in 1844 coincided with the Industrial Revolution, which brought about, in its train, what is not less important for us to appreciate, an Agricultural Revolution. The human community, long stabilised in its relationships and living, as has been said, in an England which was "a granary and a sheepfold," was subjected to a violent upheaval, brought about by the changed conditions of living no less than by the wars of the period. From this upheaval, the middle classes, hitherto unrecognised, emerged wealthy and supreme; and manufactures, towns, transport, roads, export, presented new problems. From being used as the source of motive power, since the 7th century B.C., for armies, the horse now became, for the first time on this grand scale, a chief source of motive power and mobility for a restive civilian community. And the advent of steam power, after the first quarter of the 19th century, failed to displace the horse from its position of supremacy, as had then been feared.

It was not until the early part of the present century, with the advent of the internal combustion engine, causing the rapid disappearance of this animal, which had demanded from the public the chief share of veterinary attention, particularly in transactions for its sale and purchase, that the urgent desire to extend veterinary training to meet other demands became deeply felt. For a time, remunerative employment in default of horse practice was obtained from the increasing value paid by the public to its household animals—dogs and cats—the place of which in the psychological make-up of the community would be

hard to define and overestimate in possible importance. It is only within the last few decades, especially since the newer knowledge of nutrition has shown clearly the particular value of milk as a human food, that the milch cow has won her way to supremacy—for how long in view of the possibilities of advances in devising new means of importation of perishable foodstuffs, such as milk, no one can foretell.

This much needs to be said once more regarding the change in emphasis placed by the public during the course of years on the relative importance of the various domesticated animals, lest a charge be made of culpable neglect in meeting the present situation, while all the time those who have had to frame the education of veterinary students have had to meet with very fluid situations.

Although therefore the veterinary schools in Europe were opened in an atmosphere which foretold promise of valuable contributions to the control of the great animal plagues and to knowledge of natural history, the trends at nearly all of them soon became to constrict effort by turning out graduates capable of earning their living at the tasks for which the public were willing to remunerate them. Moreover, the trained men had to face the hardship of earning such a living in competition with the untrained men who were already practising their art in town and country. With native wisdom, William Dick, when he opened his veterinary school in Edinburgh in 1823, foresaw the need to turn out men equipped to face successfully such competition, but elsewhere that wisdom did not prevail, with the result that the competition persists as an evil to this day. Anomalous situations in the teaching arose at the schools. Side by side with demands on the students for the display of intellectual capacity by the acquisition of knowledge of the details of a subject such as systematic botany, skill in coarse craftsmanship such as in practical horse-shoeing was made obligatory in some of the continental schools. The teachers themselves were either on the one hand craftsmen who developed their technical or professional skill without being able to absorb for the advancement of their craft any knowledge from outside sources or else, on the other hand, specialists highly learned in some form of erudition but unable to apply anything from their learning to the advancement of veterinary knowledge. The teaching of anatomy, almost entirely confined to that of the horse, was well imparted, usually as one of the fundamentals of training, but for long physiological teaching was meagre and mainly culled from human sources. As the 19th century wore on, however, several teachers of the highest excellence appeared at the continental schools, and after the Pasteurian era had dawned they were possessed of an array of men of especial brilliance. Names like Ellenberger, Bollinger, Friedberger, Chauveau, Bang, Ostertag and Nocard shine out with lustre. The veterinary schools in Britain, for long starved of public support, were not so fortunate, and the strength of the veterinary profession in this country has been well ascribed not so much to the distinction of its teachers or to the help received from outside sources as to the possession of a unique band of private practitioners, of sound competence and high moral qualities, who have won for it the confidence of the general public.

It was in a setting such as has now been portrayed, when the schools had settled to the turning out of craftsmen, by temperament and outlook, specially

fitted to live, often lucratively, as horse practitioners, and had not been as yet, as they were later, roused to enthusiasm by the eagerness of some of their more brilliant teachers to exploit the Pasteurian doctrine at its inception, that occurred the most epoch-making event since Aristotle in the field of comparative biological study, namely, the publication of Charles Darwin's *Origin of Species* in 1859. And this occurrence was almost unnoticed at the schools, so little were its implications felt to be disturbing to their precepts. Yet, the theories enunciated by Darwin clearly stated, or re-stated, on evidence that could not easily be refuted, that the mental processes, both of man and other animals, were the subject of evolutionary development in the same way as other bodily structures and functions. Aristotle, when he said that "man was a political animal," may be taken to have implied that man did not differ from other animals except in the most particular respect that he was "political."

However, we need not hesitate to say that we believe the ordinary practitioners of those days, assessed as they must have been for their competence by a discriminating public that was not itself devoid of powers of noticing animal behaviour, could not have made a living in face of competition in private practice if they could not give the appearance, at any rate, of exceptional skill in dealing with animals.

(3) Development of the Study of Animal Behaviour Following Darwin

This development, it has been said, has been so haphazard, fitful and discontinuous that, in spite of the mass of information scattered in books and periodicals upon it, it has been in danger of extinction as an orderly study directed to any purposive end. Its development has been said to fall roughly into three periods :—

(a) *The Anecdotal, or Literary, Period.*—This period persisted for several years, during which people who thought they had fully grasped, and all too readily, the Darwinian doctrine did more harm than good to the study by accepting the doctrine uncritically. Such people thought that they could detect in the behaviour of animals characteristics that were essentially "human" but that were thwarted in development. By thus "anthropomorphising" animals other than man, they failed to appreciate that the "mind" of each separate species had evolved from a remote past along more or less widely divergent lines, the common ancestor of any two surviving species sometimes to be traced only in a distant geological age.

(b) *The Experimental Period.*—During this period ingenious contrivances, such as mazes and other obstacles placed in the way of the different animals reaching their food, were devised to find out something about their intelligence and learning processes. Even Pavlov's more recent experiments on the "conditioned" reflexes may be relegated to this period. About the most useful acquisition was the information obtained on the devices necessary for these studies, but on the whole the conditions in which the experiments were carried out were so highly artificial that the information did not surely predict the actual behaviour of the animals in their natural environment.

(c) *The Modern Period of Studying the Behaviour of Animals in their Natural Setting.*—These methods differ little from those practised by the animal

ecologist. In some ways the mode of study can be related to that of the so-called *Gestalt* school of psychology and also to the "behavourist" school of Watson. There seems, however, to be little real need for encumbering the study of animal behaviour with the confusing terminology of the various schools of psychology, which are largely speculative and philosophic, and not grounded on a broad and sound knowledge of those biological sciences which have been already referred to and are rapidly expanding.

As Walton properly stressed at a recent meeting of the Comparative Section, Royal Society of Medicine, dealing comparatively with the mode of fertilisation in the bovine and porcine species, when one has taken into account the differences in anatomy and physiology, and in the simple nervous reflexes and the conditioning of those reflexes in the two species, there is hardly anything left for the speculative psychologist to explain. These views have indeed been emphasised for many years by workers who have taken within their ambit behaviour studies on animals ranging upwards from the unicellular animals right up through the complex zoological stages in evolution, reaching finally to the Primates.

The range of studies covered by the domesticated animals is a very small one, and from the comparative standpoint a good deal that is of great interest can be obtained from the observation of other species. The authors of a recent standard text-book have indeed been moved to say that it may be more instructive and far more important to the advance of psychology to trace the evolution of behaviour from an amœba to an earthworm than to understand the differences between a chimpanzee and a man.

(To be continued)

VARIATION IN SOME PHYSIOLOGICAL ACTIVITIES OF DAIRY COWS—I

By K. L. BLAXTER and H. PRICE,
National Institute for Research in Dairying, University of Reading

In a previous paper in this Journal (Blaxter, 1943a), an account was given of the factors responsible for the large variation in the heart rate of the cow during a 24-hour period. During the assessment of changes in the total metabolism of dairy cows when stimulated by feeding thyroid-active materials (Blaxter, 1943b), considerable additional data has become available for normal cows showing both the extent of individual differences in heart rate and the changes in the heart rate occurring in longer periods of time. These observations have been supplemented by a detailed study of four cows for a 48-week period in which respiration rates, body temperatures and milk yields have also been recorded.

It is obvious that information collected incidental to short-term experiments is not so complete as that collected during the supplementary study. For this reason the latter is presented in full, while the former is only used for corroboratory purposes.

Animals, Methods and Presentation

Details of the four cows in the Institute herd which were used for the investigation are shown in Table 1. They were chosen so that two would

calve in the autumn and two in the winter or spring. Heart rates were taken during each milking interval, from 6.30-8.00 a.m. and from 3.30-5.00 p.m. on six days of each week from May 31, 1943, to April 29, 1944. These rates were taken by direct auscultation with a stethoscope and care was taken to cause the minimum disturbance at this time. During the milking interval the cows in this herd are extremely quiet, and for this reason the heart rates can be called "resting heart rates." Body temperatures were taken per rectum with a clinical thermometer, ensuring a deep insertion and ample contact of the bulb of the thermometer with the rectal wall, while respiration rates were taken by carefully recording the number of flank movements occurring in one minute. Body temperatures and respiration rates were only recorded during the morning milking interval. The feeding and management of the cows was the same as for other cows in the herd, and a detailed record of their food consumption and milk production was thus available.

TABLE 1

Some details of the four cows used for the study

Name of cow	*Breed*	*Weight in lb. on 1.6.43*	*Date of birth*	*Date of last calving*	*Date of effective service*	*Date of calving*	*Date of next effective service*
Welcome 9	S	1,289	5.2.38	14.9.42(2)	28.1.43	13.11.43(3)	After May, '44
Campion 11	S	1,220	19.3.39	6.12.42(2)	13.2.43	1.12.43(3)	4.2.43
Truth	G	863	25.2.40	1.2.43(1)	6.5.43	8.2.44(2)	9.5.44
Lily 7	S	1,173	9.8.38	9.1.43(2)	1.7.43	18.4.44(3)	After May, '44

The figures in brackets show the number of times the cow has calved.
S = Shorthorn. G = Guernsey.

Results

The data are presented in four sections. The first deals with the frequency distributions of the determinations, and the relative accuracy of the observations. The second and third sections deal with the changes associated with pregnancy and lactation. In the last section the influence of environmental temperature is discussed.

(a) The frequency distributions of heart rates, respiration rates and body temperatures.

The percentage frequency distributions of the heart rates, each based on 270 to 290 morning and 270 to 290 evening observations for each cow, are shown in Table 2.

TABLE 2

Percentage frequency distributions of morning and evening heart rates per minute for the four cows

Heart rate range	*Truth*			*Lily 7*			*Welcome 9*			*Campion 11*		
	a.m.	*p.m.*	*Total*	*a.m.*	*p.m.*	*Total*	*a.m.*	*p.m.*	*Total*	*a.m.*	*p.m.*	*Total*
40 to 44	—	—	—	0.7	—	0.4	—	—	—	—	—	—
45 to 49	0.4	—	0.2	6.4	4.6	5.5	—	—	—	0.7	—	0.4
50 to 54	5.7	7.6	6.7	10.4	9.9	10.1	3.9	0.4	2.1	3.2	1.1	2.1
55 to 59	27.9	14.2	20.9	25.4	11.3	18.3	14.5	4.5	9.5	27.4	3.9	15.6
60 to 64	32.1	22.5	27.2	27.5	21.1	24.3	25.1	16.7	20.8	34.4	24.9	29.6
65 to 69	14.6	23.5	19.2	18.2	26.1	22.2	32.5	22.6	27.5	19.7	37.2	28.4
70 to 74	10.3	17.0	13.7	5.4	15.5	10.5	15.9	29.9	22.9	10.2	18.9	14.6
75 to 79	7.5	7.6	7.6	3.6	5.7	4.6	4.9	17.0	11.0	3.2	6.3	4.7
80 to 84	1.5	6.2	3.9	2.1	3.9	3.0	2.1	3.1	2.6	1.4	2.8	2.1
85 to 89	—	1.0	0.5	0.0	0.7	0.4	0.7	4.2	2.5	—	2.8	1.4
90 to 94	—	0.3	0.2	0.4	1.1	0.7	0.0	1.7	0.9	—	2.1	1.1
95 to 99	—	—	—	0.0	—	0.0	0.4	—	0.2	—	—	—
100 to 104	—	—	—	0.4	—	0.2	—	—	—	—	—	—
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Mean rate	63.2	66.1	64.6	61.6	64.7	63.1	65.6	70.6	68.1	63.1	68.3	65.7
a.m.-p.m. difference		2.9			3.1			5.0			5.2	

He was the eldest of a family of twelve, eleven boys, the youngest being a girl. His father was in the 6th Dragoon Guards (Carbiniers). He also must have been a man of talent, for it is said that he could play every instrument in the regimental band. At the age of two Joseph accompanied his parents and the regiment to India, and the next ten years were spent in that country. Subsequently the regiment returned to this country, being stationed at Leeds and Edinburgh. Whilst in Leeds he attended the Grammar School, and in Edinburgh the Royal High School. Whilst at Leeds he acquired, with true Yorkshire zest, that great love of cricket which was subsequently to become almost a passion. In due course, when he was sixteen, he entered the New Veterinary College, Edinburgh, and so came under the influence of William Williams, senior, who was Principal at that time. Williams was a man of great personality and ability and a teacher who left an indelible impression on his students. It is true to say that he remained the hero of Brittlebank's life. On the slightest provocation, even up to the time of his death, J.W.B. would eulogise the master. He would say that the "Old Man's" ideas were 100 years ahead of his time, and that as a diagnostician he was in a class by himself. He used to say that the "Old Man" could tell where a horse was lame by just hearing it walk. As Joseph had joined the College at the age of sixteen and was successful in his course, he had to interrupt his studies at the College before entering for his final examination. This period was spent profitably as assistant to W. Atkinson, of Masham. In due course he qualified M.R.C.V.S. and then joined the Army. He was attached to his father's regiment as Veterinary Officer. One year of this was all that he could bear, for his energetic nature rebelled against "the monotony of attending to cavalry horses that were rarely ill."

So in the year 1898 we find him retired from the Army and appointed Professor of Veterinary Science at the Royal Agricultural College, Cirencester. He retained this post for two years and then went into general practice at Oswestry, taking over the practice of Mr. Lloyd, who had been appointed veterinary surgeon to the Manchester Corporation when that post was first instituted. In due course Lloyd transferred to Sheffield and Brittlebank, again succeeding him, took up the appointment as Veterinary Officer to the Manchester Corporation in 1905. Thus he began a long period in municipal service which lasted until 1930. It may be said that Brittlebank was one of the few who were responsible for the great extension of veterinary public health service, and that the present status and usefulness of that service is in no small measure due to his whole-hearted enthusiasm, his capability and vision. His plans and methods for ensuring a clean and wholesome milk supply have received full recognition in the recently published Government White Paper on milk.

Whilst in Manchester he was at pains to make contacts which would not only assist him in his own efforts but would also bring credit to his profession. He collaborated with the late Professor S. Delepine, who was then at the Manchester Public Health Laboratories. They worked together particularly in the fight against tuberculosis, and it was these two men who were largely responsible for the establishment of the postgraduate course and examinations leading to the Diploma in Veterinary State Medicine at Victoria University, Manchester. This was an epoch-making event in the history of the profession. In the realms of Veterinary State Medicine no one has done more to place the service on a

LIEUT.-COLONEL JOSEPH WILLIAM BRITTLEBANK, C.M.G., M.R.C.V.S., D.V.S.M. (Vict.).

secure foundation and to secure for it its proper recognition in the public esteem.

During these busy years, Brittlebank found time to take a deep interest in the political and social sides of his profession. He was elected a Member of Council, R.C.V.S., in 1914, Vice-President in 1923, 1925 and 1929, and President of the College in 1926 and 1928. A good committee man, he served as Chairman of the Parliamentary Committee of the R.C.V.S. For many years he was President of Victoria Veterinary Benevolent Fund, and he was the Honorary Secretary of the National Veterinary Benevolent and Mutual Defence Society for seven years. He was also a member of the Council of the latter body. He served as external examiner for the Universities of London and Liverpool, and for some time he was Chairman of the Board of Veterinary Studies in the latter institution. He was Hon. Treasurer of the eleventh International Veterinary Congress (1930). He joined the Army Veterinary Service in September, 1914, serving until September, 1919. His powers of organisation were soon recognised, and he was appointed to command the Veterinary Hospital and Remount Depot at Ormskirk. In 1918 he became A.D.V.S., Western Command. For his war service he was appointed C.M.G. Returning to his post in Manchester, he lived at Rhyl in North Wales, where he was instrumental in reviving the defunct Rugby Football Club. This, like most other things which he tackled, soon became a flourishing affair.

In Manchester he held the position of Chairman of the Manchester Corporation Ex-Service Men's Association, a job dear to his heart and from which he got great pride and pleasure. In 1930 he retired from his municipal appointment to enter commercial life. He became a director of a large dairy. From this he retired in 1935, for his two younger sons having expressed a desire to become veterinary surgeons he decided to re-enter general practice. He purchased the practice at Sawbridgeworth and, in spite of his long period of whole-time service, he started on his new duties with great vigour and enthusiasm. He built up a reputation as a sound practitioner and the practice extended. He also had the reputation of being one to whom one could turn for advice and help in other than the purely veterinary sphere, and in this way he became a "friend and father" in the countryside. One typical example of this can be related. Just after he became seriously ill one elderly farmer's wife rang up to ask him "why for the first time in 50 years her butter had failed to come." Unfortunately one son changed his mind as to his career and the other answered the call to duty and joined the R.A.F. This boy was killed in a flying accident in 1942, a blow from which Brittlebank never really recovered. His work for his profession continued without respite, and it must have given him great pleasure when on the centenary of the Royal College of Veterinary Surgeons the Central Society conferred its Honorary Fellowship on him as a token of respect and also in recognition of all the work he had done on behalf of the profession.

Brittlebank the Man

Titles and honours are an outward token of respect and regard, but the truest mark of the deepest regard is when a man has earned the right to be called by his Christian name by his friends and even more so his political adversaries. Now, Brittlebank was "Joe" on all but the most ceremonious of

occasions. He was a happy man, big in mind and body, grand company, fond of sport and the good things of life, and nothing gave him greater pleasure than to share his pleasures with others. He loved little children and they, in turn, adored him. For years he never missed a Grand National, and his story of how he made over £300 on "Wild Man of Borneo," told in his own inimitable style, was unique. He was a keen gardener, as all who visited his home could see. His family life was a happy one. He was married twice. His first wife was a Miss Powley of York. His second wife, who survives him, was a daughter of the late W. R. Davis of Enfield and granddaughter of Principal Williams, Snr. W. R. Davis was a man after Brittlebank's heart, a most competent veterinary surgeon and one greatly devoted to his profession. It is said that the amount of "shop" that these two would discuss would have filled hundreds of books.

On the many councils and committees on which he sat Joe Brittlebank was a giant amongst men. Sagacious, progressive, far-seeing, and of the utmost integrity, his knowledge of men and affairs was remarkable. He would sit, apparently asleep, with a "Richmond Gem" in his mouth, but nothing escaped his notice. Any measure which he thought was for the good of his profession he would sponsor, and no opposition would stop him. Like his old friend, James Macqueen, he had that wonderful gift of being able to summarise in few words the babbling of the many, but woe betide those who would stray from the straight and narrow path, for his command of the English language was such that he would wither them to their very roots. He was never afraid to say straight out what he honestly believed to be the truth, so that there were times when he made some people angry, but he never lost their respect.

And so a great man has passed, one who in many ways exemplified all that was good in the past, was progressive and up to date and could control the ebullient politicians of to-day.

We have lost a great counsellor, one whose name will live in veterinary history and whose place will be difficult to fill.

The funeral took place on December 21, and at the service at St. Mary's Church, Sawbridgeworth, the profession was represented by H. Andrew, S. B. Vine, Ramsay Millar, and C. W. Abrams.

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